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ABSTRACT

A study was conducted to verify the findings of previous research showing that a difference in recall of superordinate and subordinate level concepts existed among various reading ability groups within the same grade of elementary school children. Instead of especially constructed passages used in the previous studies, the study used actual elementary school textbook materials. Subjects, 81 fifth grade students, identified as either above average, average, or below average readers, read a passage from a science text determined to be at the fifth grade reading level. The passage contained one superordinate concept, three coordinate concepts, and twenty-four subordinate concepts. After they had read the passages, the subjects wrote all they could recall about it, and these protocols were analyzed by two different raters. Results showed that above average and average readers had significantly greater recall of concepts at the coordinate and subordinate levels and had greater sensitivity to the coordinate concepts than did the below average students. The results (1) suggest that reading instruction should emphasize identification of supporting main ideas as well as the major idea and relevant details, and (2) reinforce both the need to teach outlining as a study skill and the use of syntactic webbing activities to help students identify relationships between ideas. (FL)

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Effects of Text Structure on Children's Recall of Science Text

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Effects of Text Structure on Children's Recall of Science Text

The effects of text structure of connected discourse upon recall is an area receiving increasing attention in reading comprehension research. Most of this research (Kintsch, Kozminsky, Streby, McKoon, & Keenan, 1975; Caccamise & Kintsch, 1978; Meyer, Brandt & Bluth, 1980; Meyer, 1977; Miller, Perry, & Cunningham, 1977) has been conducted with adult or secondary school age subjects. Very little research (Taylor, 1980; McGee, 1982; Tierney, Bridge & Cera, 1978-79) in this area has been done with elementary school age subjects. The purpose of this study was to determine whether there were differences in recall of superordinate, coordinate and subordinate conceptual levels of expository text by fifth-graders of above average, average and below average reading ability.

Results from the studies with mature readers as subjects support the concept that superordinate information is recalled better than subordinate information. These findings coincide with current theories of memory (Goetz & Armbruster, 1980) like Kintsch's and Craik and Tulving's or Ausubel's. For example, Kintsch's model suggests that the position of the proposition in the structural organization influences the probability of recall. Ausubel's supports the idea that information is hierarchically ordered and retention is affected by the position of information in the hierarchy.

However, the few studies that have been done with elementary age children offer conflicting results of the impact of text structure, as pertaining to superordinate and subordinate concepts, upon recall. For example, Taylor (1980) reported that there were no differences among sixth-grade good readers and poor readers or fourth-grade good readers in the use of top-level structure to organize immediate recalls. There was also no difference in the use of top-level structure between sixth-grade poor readers and fourth-grade good readers to organize delayed recalls.

However, more sixth-grade good readers used the top-level structure to organize delayed recalls. One of Taylor's conclusions was that there were differences in recall based upon reading ability and that recall ability was influenced by readers' ability to follow top-level structure.

Tierney, Bridge and Cera (1978-79) found that third-grade good readers recalled more information from expository text than third-grade poor readers. However, neither group was sensitive to the different levels of text structure. McGee (1982) found that fifth-grade good readers recalled proportionately more superordinate and total ideas than fifth-grade poor readers and third-grade good readers. It was also found that fifth-grade poor readers recalled more superordinate ideas than did the third-grade good readers. The findings of these studies suggest the possibility of developmental stages in acquiring awareness of text structure.

This study sought to verify the findings of previous research that a difference in recall of superordinate and subordinate level concepts existed between the various reading ability groups of elementary age students. In the previous studies, passages constructed by the investigators were used. In this study, a passage was taken from an actual textbook in use in elementary classrooms. This was done because the materials would more realistically represent what students have to use in a classroom setting.

Additionally, the two top levels of the superordinate concepts were analyzed separately. The very top-level superordinate concept was considered to be the major conceptual organizer under which all other ideas were subsumed. The second level consisted of coordinate main ideas interspersed throughout the text which supported the superordinate concept. This separate analysis of the top two levels of superordinate ideas was not done in the previous studies with children.

Method

Eighty-one fifth-graders comprising four classes in an elementary school in Nebraska were used in the study. The subjects' reading ability was identified by their classroom teachers who rated them as being either above average, average or below average in daily reading performance.

A 243 word passage entitled "Worms" from the fifth-grade level text, Science: Understanding Your Environment (Mallinson, et. al., 1981), published by Silver Burdett Company was used. This passage was selected because it had a fifth-grade level of readability as determined by the Fry Readability Graph (1977) and a cohesive superordinate, coordinate and subordinate text structure. The passage contained one superordinate concept, three coordinate concepts interspersed throughout the text, and twenty-four subordinate concepts. These concepts were identified using an adapted tree diagram format used by Meyer (1977).

The subjects were presented the passages and given ten minutes to read it. The passages were then collected and the subjects asked to record in writing what they could recall about the passage.

The subjects' protocols were analyzed by two raters (inter-rater agreement = 91%) who classified each idea recalled at the respective discourse level. Three chi-square analyses and a one-way analysis of variance procedure were computed to test differences between reading ability and ability to recall information at the different levels of text structure.

Results

In the first chi-square analysis (see Table I), the subjects were assigned to cells based on reading ability and recall accuracy of the superordiante concept. There was no significant difference in the proportionate number of subjects' recall of the superordinate concept when distinguished by reading ability. There

was a difference, however. (see Table II) when subjects' recall of one or more interspersed coordinate concepts was analyzed. Proportionately more above average and average readers recalled one or more coordinate concepts than did below average readers.

Insert Tables I and II about here

The third chi-square analysis (see Table III) was computed to try and replicate findings of previous research by combining the top-levels of discourse structure (superordinate-coordinate). Using this method of analysis, more above average and average readers than below average readers were again found to recall concepts from the top-levels of discourse.

Insert Table III about here

The results ($F = 9.72$, $p < .01$) of the one-way analysis of variance indicated that there was a difference in the number of subordinate ideas recalled by the different reading levels. A Newman-Keuls Q-start procedure was computed to determine the differences between the respective groups. The mean ($\bar{X} = 7.4$) number of subordinate ideas recalled by the above average readers was statistically significantly ($F = 5.93$, $p < .01$) higher than that of the below average readers ($\bar{X} = 3.96$) as was the mean ($\bar{X} = 6.64$) of the average group ($F = 4.64$, $p < .01$). The means of the above average and average groups were not statistically significantly different.

Discussion

Above average and average readers had significantly greater recall of con-

cepts at the coordinate and subordinate levels. This suggests that recall of the coordinate level concepts facilitates subordinate level recall. If so, future investigations should test this hypothesis. It would be interesting to determine if the coordinate level concepts are more important as conceptual organizers than are the superordinate concepts. Future research in which the superordinate and coordinate levels of text structure are classified separately should enhance clarification of the validity of theories of memory such as Ausubel's subsumption theory and Craik and Tulving's spread of processing theory (McKoon, 1977; Miller, Perry, & Cunningham, 1977).

Additionally, the results suggest that average and above average fifth-grade readers display greater sensitivity to the coordinate concepts as well as having greater recall of the subordinate concepts than do below average fifth-grade readers. This suggests that instruction should emphasize identification of supporting main ideas as well as the major idea and relevant details. The results also reinforce the need to teach outlining as a study skill and the use of sencantic webbing activities to help identify relationships between ideas.

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Table I

Chi-Square Analysis of Subjects' Recall
of Superordinate Concept
By Reading Ability Level

	Reading Ability		
Recall Accuracy	Above Average	Average	Below Average
Recall	5	6	7
Nonrecall	15	26	22

$\chi^2 = .374$, df = 3, $p > .05$

Table II

Chi-Square Analysis of Subjects' Recall
of Interspersed Coordinate Concepts
by Reading Ability Level

	Reading Ability		
Recall Accuracy	Above Average	Average	Below Average
Recall	13	23	10
Nonrecall	7	9	19

$\chi^2 = 9.40$, df = 2, $p < .01$

Table III

Chi-Square Analysis of Subjects' Recall of Superordinate and Interspersed Coordinate Concepts by Reading Ability Level

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	Reading Ability		
Recall Accuracy	Above Average	Average	Below Average
Recall	16	25	13
Nonrecall	4	7	16

$z^2 = 9.71$, df = 3, $p < .01$